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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/779,738	02/18/2004	Hideki Yoshida	05225.0260	9440

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EXAMINER	
TSAI, SHENG JEN	
ART UNIT	**PAPER NUMBER**
2186	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/26/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/779,738	YOSHIDA ET AL.	
	Examiner	Art Unit	
	Sheng-Jen Tsai	2186	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 January 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10 and 12-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,12-14 and 17-20* is/are rejected.

7)☒ Claim(s) *3, 5-10 and 15-16* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is taken in response to Applicants' Amendments and Remarks filed on January 3, 2007 regarding application 10,779,738 filed on Feb. 18, 2004.

2. Claims 1 and 19-20 have been amended.

Claim 11 has been cancelled.

Claims 1-10 and 12-20 are pending for consideration.

3. ***Response to Remarks and Amendments***

Applicants' amendments and remarks have been fully and carefully considered.

In response to the amendments, one of the previously applied references (Hara et al., US Patent Application Publication 2004/0205109) has been removed as a reference.

Meanwhile, a new ground of claim analysis based on a newly identified reference (Ulrich et al., US Patent Application Publication 2002/0138559) has been made. Refer to the corresponding sections of the claim analysis for details.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-2, 4, 12, 14 and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujiwara et al. (US Patent Application Publication 2003/0140051), and in view of Ulrich et al. (US Patent Application Publication 2002/0138559).

It is noted that, in the following claim analysis, those elements recited by the claims are presented in **bold** font.

As to claim 1, Fujiwara et al. disclose **a storage apparatus used in a distributed storage system** [System and Method for Virtualization a Distributed network storage as a Single-View File system (title); figure 1], **comprising**:

a file memory to store data corresponding to identifiers of an allocated area in an identifier space [figure 1, items 3, 4 and 5 show a distributed storage system each having memory to store files];

a first memory to store a basis position of the allocated area in the identifier space [the corresponding basis position is 0 to N-1, respectively, for the N storage devices (figure 1, items 3, 4 and 5), as specified by the modular (mod) operation for determining the storage location (paragraphs 0036~0041)];

a second memory to store a weight of the storage apparatus as a performance degree [the corresponding weight is a "1" for all storage devices since all storage devices are treated equally when determining the storage location (paragraphs 0036~0041)], **the weight being calculated by at least one of storage capacity, calculation ability, and circuit of the storage apparatus** [this limitation is disclosed by Ulrich et al., see below];

a first decision unit configured to decide a space width to divisionally allocate the identifier space with another storage apparatus by using the weight and a weight of the another storage apparatus, the another storage apparatus allocating a neighboring area of the allocated area in the identifier space [the

particular locations occupied by each storage devices (figure 1, items 3, 4 and 5) in the identifier space is determined by the storage location determination function (paragraphs 0036~0041); the example described in paragraphs 0036~0041 illustrates that the entire identifier space is equally divided among the three storage devices, since the 3 storage devices are treated equally with the same weight, thus the space width is one third of the entire identifier space for each storage device; Each file is stored in a network storage uniquely determined by a file path name's hash value and a storage location determination function using as an argument the number of network storages for distributively storing files. According to the embodiment, for example, a hash function is assumed to be the remainder resulted when the sum of component character strings constituting a path name is divided by 2 to the 16th power. The storage location determination function f is assumed as follows (paragraphs 0036~0041); Based on an object identifier's hash value, each network storage determines whether or not the network storage itself should process the access request. When the local network storage is eligible for processing, it processes the request (paragraph 0014);]; **and**

a second decision unit configured to decide the allocated area of an area between the basis position and a basis position of the neighboring area in the identifier space by using the space width [Each file is stored in a network storage uniquely determined by a file path name's hash value and a storage location determination function using as an argument the number of network storages for distributively storing files. According to the embodiment, for example, a hash function

is assumed to be the remainder resulted when the sum of component character strings constituting a path name is divided by 2 to the 16th power. The storage location determination function f is assumed as follows (paragraphs 0036~0041)].

Regarding claim 1, Fujiwara et al. do not teach that **the weight of the storage apparatus is calculated by at least one of storage capacity, calculation ability, and circuit speed of the storage apparatus**.

However, Ulrich et al. disclose in their invention "Dynamically Distributed File System" a distributed file system where the storage of a file into a plurality of storage devices is determined, at least, by the storage capacity of the of the storage devices [figures 34A~34C, 3485, Disk Space; paragraph 0425].

Dynamically distributed files according to the storage capacity of the plurality of disks allows loads to be balanced among all the storage devices, and prevents the failures of an over-loaded device to cause the entire storage system to break down.

Therefore, it would have been obvious for one of ordinary skills in the art at the time of Applicants' invention to recognize the benefits of dynamically distributed files according to the storage capacity of the plurality of disks, as demonstrated by Ulrich et al., and to incorporate it into the existing method disclosed by Fujiwara et al. to further improve the reliability of the storage system.

As to claim 2, Fujiwara et al. teach that **the storage apparatus according to claim 1, wherein said first decision unit calculates a sum of the weight of the storage apparatus and the weight of the another storage apparatus, divides the weight of the storage apparatus by the sum, and sets the division result as the**

space width [the particular locations occupied by each storage devices (figure 1, items 3, 4 and 5) in the identifier space is determined by the storage location determination function (paragraphs 0036~0041); the example described in paragraphs 0036~0041 illustrates that the entire identifier space is equally divided among the three storage devices, since the 3 storage devices are treated equally with the same weight, thus the space width is one third of the entire identifier space for each storage device].

As to claim 4, Fujiwara et al. teach that **the storage apparatus according to claim 1, wherein the basis position of the another storage apparatus is nearest to the basis position of the storage apparatus in other storage apparatuses each of which has a different basis position in the identifier space, and wherein the another storage apparatus is regarded as a neighboring storage apparatus** [the corresponding basis position is 0 to N-1, respectively, for the N storage devices (figure 1, items 3, 4 and 5), as specified by the modular (mod) operation for determining the storage location (paragraphs 0036~0041); the particular locations occupied by each storage devices (figure 1, items 3, 4 and 5) in the identifier space is determined by the storage location determination function (paragraphs 0036~0041); the example described in paragraphs 0036~0041 illustrates that the entire identifier space is equally divided among the three storage devices, since the 3 storage devices are treated equally with the same weight, thus the space width is one third of the entire identifier space for each storage device].

As to claim 12, Fujiwara et al. teach that **the storage apparatus according to claim 1, wherein the data stored in said file memory is a file or a block of a file** [file system, figure 1, 7 and 8].

As to claim 14, Fujiwara et al. teach that **the storage apparatus according to claim 1, wherein the storage apparatus corresponds to a plurality of virtual nodes each of which has a different basis position in the identifier space** [the corresponding basis position is 0 to N-1, respectively, for the N storage devices (figure 1, items 3, 4 and 5), as specified by the modular (mod) operation for determining the storage location (paragraphs 0036~0041); the particular locations occupied by each storage devices (figure 1, items 3, 4 and 5) in the identifier space is determined by the storage location determination function (paragraphs 0036~0041); the example described in paragraphs 0036~0041 illustrates that the entire identifier space is equally divided among the three storage devices, since the 3 storage devices are treated equally with the same weight, thus the space width is one third of the entire identifier space for each storage device]**, and wherein said second decision unit respectively decides the allocated area of each of the plurality of virtual nodes** [Each file is stored in a network storage uniquely determined by a file path name's hash value and a storage location determination function using as an argument the number of network storages for distributively storing files. According to the embodiment, for example, a hash function is assumed to be the remainder resulted when the sum of component character strings constituting a path name is divided by 2 to the 16th power. The

storage location determination function f is assumed as follows (paragraphs 0036~0041)].

As to claim 17, Fujiwara et al. teach that **the storage apparatus according to claim 14, wherein each virtual node has a common weight previously assigned** [the example described in paragraphs 0036~0041 illustrates that the entire identifier space is equally divided among the three storage devices, since the 3 storage devices are treated equally with the same weight, thus the space width is one third of the entire identifier space for each storage device].

As to claim 18, Fujiwara et al. teach that **the storage apparatus according to claim 4, wherein one of other storage apparatuses of which the basis position is the n-th (n: predetermined integral number above one) nearest to the basis position of the storage apparatus in all basis positions of other storage apparatuses is regarded as a neighboring storage apparatus** [the corresponding basis position is 0 to N-1, respectively, for the N storage devices (figure 1, items 3, 4 and 5), as specified by the modular (mod) operation for determining the storage location (paragraphs 0036~0041); the particular locations occupied by each storage devices (figure 1, items 3, 4 and 5) in the identifier space is determined by the storage location determination function (paragraphs 0036~0041); the example described in paragraphs 0036~0041 illustrates that the entire identifier space is equally divided among the three storage devices, since the 3 storage devices are treated equally with the same weight, thus the space width is one third of the entire identifier space for each storage device], **and wherein said second decision unit decides the allocated area**

of the storage apparatus for the neighboring storage apparatus [Each file is stored in a network storage uniquely determined by a file path name's hash value and a storage location determination function using as an argument the number of network storages for distributively storing files. According to the embodiment, for example, a hash function is assumed to be the remainder resulted when the sum of component character strings constituting a path name is divided by 2 to the 16th power. The storage location determination function f is assumed as follows (paragraphs 0036~0041)].

As to claim 19, refer to "As to claim 1" presented earlier in this Office Action.

As to claim 20, refer to "As to claim 1" presented earlier in this Office Action.

As to claim 13, neither Fujiwara et al. nor Ulrich et al. teach that **the address of the storage apparatus is an IP address**.

However, the inventions of both Fujiwara et al. and Ulrich et al. are directed to a distributed network storage system [figure 1, 2 shows a network router connected to three storage devices]. And it is well known in the art that, in a distributed network system using a router, each entity in the system is assigned an IP address for the purpose of communicating with other entities. Thus this claim lacks patentable significance.

Allowable Subject Matter

7. Claims 3, 5-10 and 15-16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. ***Related Prior Art of Record***

The following list of prior art is considered to be pertinent to applicant's invention, but not relied upon for claim analysis in this Office Action.

- Zohar et al., (US Patent Application Publication 2005/0015566), "Data Allocation in a Distributed Storage System."
- Sinclair et al., (US Patent Application Publication 2003/0074348), "Partitioned Database System."
- Sinclair et al., (US 7,080,072), "Row Hash match Scan in a Partitioned Database System."
- Nakano et al., (US Patent Application Publication 2003/0004975), "Database management system with Rebalance Architecture."

Conclusion

9. Claims 1-2, 4, 12-14 and 17-20 are rejected as explained above.

Claims 3, 5-10 and 15-16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sheng-Jen Tsai whose telephone number is 571-272-4244. The examiner can normally be reached on 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Kim can be reached on 571-272-4182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sheng-Jen Tsai
Examiner
Art Unit 2186

February 14, 2007

PIERRE BATAILLE
PRIMARY EXAMINER
2/16/07